ATTACHMENTS

List of Attachments:

Description	Corresponding Exhibits
ADOT Right-of-Way Surveys	None
Minimum Standards for Arizona Land Boundary Surveys	None
Classifications of ALTA-ACSM Land Title Surveys	None

ADOT Right-of-Way Surveys

The following procedures shall be performed for the preparation of Right-of-Way plans to be used for the acquisition of properties for ADOT Right-of-Way. These procedures are only required for perpetual property rights and interests and shall not be required for temporary construction easements.

Research

Pertinent record documents shall be obtained and researched. Document research for right-of-way survey starts at ADOT Records to obtain Right-of-Way plans, deeds of acquisition and as-built plans for the corridor to be surveyed. Subdivision plats, Result of Survey plats and deeds shall be acquired from the County Recorder's Office. Title reports will also be provided. Inquiries shall be made at municipal offices, utility company offices and other agencies for documentation of properties and/ or evidence to support the definition of properties in the corridor. Applicable Public Land System plats and notes shall be obtained from the Bureau of Land Management Office. Seek information from local surveyors whenever possible. Obtain parol evidence when necessary.

Right-of-Way Field Survey

Right-of-Way surveys for highway purposes are surveys of the existing or proposed right-of-way and the properties adjacent to the right-of-way. The construction of new highways will necessitate the acquisition of parts of these properties, resulting in severing existing property lines and destroying existing monuments. These procedures are intended to outline methods to perpetuate these monuments and to monument the proposed new right-of-way lines. In this process, plans will be produced to document the existing conditions prior to acquisition and to fully define the new right-of-way line and its relationship to the Public Land System.

A field survey shall be performed. The survey shall conform to ADOT procedures and standards set forth in the *Minimum Standards for Arizona Land Boundary Surveys*, as adopted by the State Board of Technical Registration that is in effect at the time the surveys are performed. Applicable statutes and regulations are to be observed in addition to these standards. Adhere to the statutes and procedures concerning entering properties and access to properties.

Right of way surveys shall be to the extent necessary to substantiate right-of-way acquisition and documentation of existing right-of-way. This policy is not intended to limit the area the surveyor must survey to establish the right-of-way. If the surveyor is unable to support the right-of-way documentation in the immediate area of the acquisition parcels, the survey must be extended to the limits necessary to recover sufficient evidence to support the right-of-way documentation for the project.

The field survey shall consist of the location of Section Corners, Quarter Corners including the Center of Section (Center Quarter Corner), and other monuments set by the Survey of the Public Lands, when applicable. Obliterated corners shall be identified, re-established, and re-monumented. Corners deemed to be "lost" shall be identified, re-established, and re-monumented as specified in the *Manual of Instructions for the Survey of the Public Lands of the United States* in force at the time of the Original Survey. The field survey shall make a reasonable attempt to find any existing corner monumentation relevant to any private property parcels; highway, canal, and railroad right-of-way monuments; as well as major and minor street centerline monumentation that are determined to be impacted by ADOT Right-of-Way

acquisition. If no monumentation is found during the field survey search, note on results of survey "not found". Existing Highway Right-of-Way, Survey, and As-Built Centerline Monumentation for the Project shall be tied to the Survey. Corners of Platted and Unplatted Subdivisions shall be tied if it can be determined that the subdivision will be impacted by new Right-of-Way acquisition.

Records

A Results of Survey Drawing shall be produced and will be utilized to develop Right-of-Way Plans. The Results of Survey will be included in the right-of-way plans set for the project. All subsequent Supplemental Results of Surveys performed for the preparation or revision of the right-of-way plans including the supplemental survey to document the documentation of the right-of-way will become a part of the Right-of-Way Plans set. These records will be archived in the right-of-way plans files and an electronic copy will be archived with ADOT TIR CADD Services and right-of-way plans shall maintain indexes for retrieval.

Defining Right-of-Way

It shall be the responsibility of the surveyor to provide evidence necessary to define the existing and/or proposed right-of-way within the project corridor. The surveyor shall use all evidence found in the field in conjunction with the existing documentation to define the project right-of-way. Sound professional judgement must be used in determination of the right-of-way. In the process of defining the right-of-way some of the field evidence may be rejected. The results of survey drawing will show all evidence collected, and indicate the reason or reasons for any evidence that may have been rejected by the surveyor.

It should be noted that the primary factor for determining existing right-of-way is documents calling for a centerline (construction, survey or right-of-way) strip description. The method used to reestablish the documented right-of-way shall be to reconstruct this centerline based upon the field evidence and record data. The documented right-of-way widths and courses can then be properly defined.

Right-of-Way Monuments

In accordance with the project's schedule as determined by the Department, Right-of-Way shall be monumented. Locations of monuments shall include intersections of Right-of-Way with section lines and recorded subdivision boundaries. Right-of-Way shall also be monumented at angle points, and at beginning and ending of curves. Monuments shall conform to standards set forth in *Minimum Standards for Arizona Land Boundary Surveys*. The monuments shall be stamped with the land surveyor's registration number.

Supplemental results of survey will be produced after the monumentation process to document all right-of-way monuments or reference monuments set, including documentation of what type monuments were set and how they are stamped.

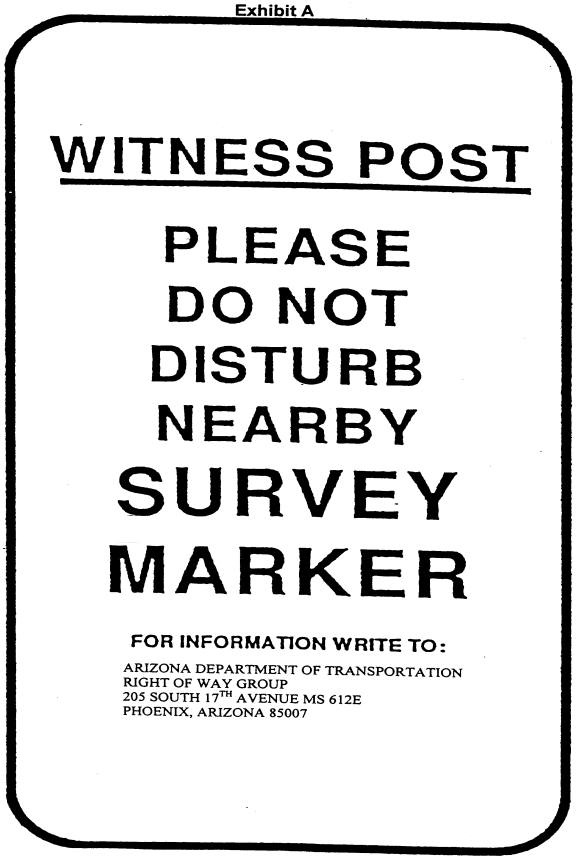
Standard ADOT Right-of-Way Markers

Upon notification from the Department, the surveyor shall set ADOT Right-of-Way markers (Standard Drawing C-21.10, C-21.20). Right-of-Way markers and alignments will be tied to the Survey.

Right-of-Way markers, (ADOT Standard Drawings C-21.10, C-21.20) not set during the acquisition process, shall be placed along Right-of-Way lines prior to, during or subsequent to roadway construction, depending upon project's requirements. The land surveyor that performed the Right-of-Way acquisition survey shall set these markers. If this is not possible, another contracted consultant professional registered surveyor or Department professional registered surveyor shall set the markers in compliance with the *Minimum Standards for Arizona Land Boundary Surveys*. Revisions to Right-of-Way alignment during the construction process shall be staked in a similar manner.

Adjacent to all monuments; where practical, a standard Department guard stake will be set. If it creates a hazard or safety problem those guard stakes will be deleted, and so noted in the monument documentation. The standard guardstake will be a 5-foot (1.5 meter) tall steel fence post with a 5-inch by 9-inch (125 mm by 225 mm) aluminum sign attached to it. See Exhibit A

Exhibit A



Monument Location

A monument will be set at the following positions for the purpose of monumenting the Department's right-of-way:

- All angle points along the right-of-way lines.
- Points left and right of points defining the alignment. In most cases the alignment will be the centerline of construction. Points defining the alignment are: angle points, curve control points, and station equations.
- Intervisible points, and/or points to render a maximum of 1000 feet (300 meters) between monuments.
- Points left and right of the Beginning of Project and End of Project.
- Points along section lines and recorded subdivision boundaries which intersect the right-of-way lines.
- It should be noted that sometimes a road or highway will be monumented on the centerline; especially when highways or roads follow sectional lines, or they are smaller or less traveled, or in urbanized areas.

Datum Specification

Unless otherwise specified by the Department, the following shall apply: the basis of coordinates for the Survey shall be the North American Datum (NAD) 1983/92 definition, or any subsequent update approved by the National Geodetic Survey Office, and codified in Arizona Revised Statutes. Coordinates shall be Arizona State Plane Coordinates with the proper zone identified (East, Central, West); bearings shall be grid bearings; the project Grid Adjustment Factor shall be applied to provide ground coordinates. The Results of Survey shall clearly state the basis of coordinates, list any ADOT or NGS Control Points used to control the Survey, the Grid Adjustment Factor used, and any other adjustments made to the survey. This information shall be included in the Right-of-Way plans and the results of survey in the form of a standard datum note.

Datum Note:

Coordinates are NAD 83/92 Modified Arizona State Plane Coordinates, _____ Zone, using a Grid Adjustment Factor of 1._____, these coordinates can be utilized as ground datum. To convert back to grid coordinates divide these values by 1._____.

Recordation of Data

The Department will receive and retain a copy of all field notes, computation sheets, calculations and pertinent documents that relate to the surveys.

Arizona State Board of Technical Registration
Minimum Standards For Arizona Land Boundary Surveys

The following statements of standards for surveying practice are promulgated as minimum standards governing the creation, establishment, retracement or resurvey of land boundaries within the State of Arizona. Applicable statutes and regulations are to be observed in addition to these minimum standards of practice.

Responsibility for adherence to the minimum standards rests with the registered land surveyor in responsible charge of the work.

Procedure

1. The land surveyor must make a diligent search for pertinent record documents. Copies of applicable deeds, maps, title report or title opinions may be necessary. If the subject property is referenced to or described as an aliquot part of the U. S. Public Land Survey System, or a fraction thereof, relevant U. S. Government plats, field notes, appropriate Manual of Surveying Instructions and special instructions should additionally be consulted, when appropriate.

2. The land surveyor must thoroughly examine the information and data acquired.

3. The land surveyor must diligently search for and identify monuments and other physical evidence which could affect the location of the subject property's boundaries. A reasonable attempt must be made to recover controlling monuments for references thereto. The positions of controlling monuments which have been obliterated should be recovered or reestablished using the best available evidence. Physical evidence of apparent use and possible rights in the subject property by others should be evaluated. Lines of possession and occupation must be located, described, and where practical, an age determination made.

4. The land surveyor must conduct field measurements necessary to adequately relate the position of all apparent evidence pertinent to the boundaries of the property. All findings resulting from the field investigation must be accurately and completely recorded and retained permanently.

5. The land surveyor must make computations to verify the correctness of field data acquired and to confirm that measurements results are within acceptable tolerance limitations. Computations must be made to determine the relative positions of all found evidence.

6. In the event of a material discrepancy or a disagreement with the measurements or monumented corner positions of another surveyor, the land surveyor must make a reasonable attempt to contact the other land surveyor and attempt to resolve the disagreement.

7. The land surveyor should make an analysis, reach a final conclusion and set monuments so as to represent the location consistent with the best evidence available of corner positions and boundary lines. The land surveyor must advise the client of discrepancies which raise doubts concerning the boundary lines of the subject property and if requested the land surveyor should provide the client with a copy of the survey report.

8. All monuments, whether set or found, must be described and specifically identified as set or found, whenever shown on maps or referred to in documents prepared by the land surveyor. Descriptions of monuments must be sufficient in detail to readily facilitate future recovery and

to enable positive identification, including map references. Monuments required by this section shall be metal, magnetically detectable, not less than one-half inch in diameter, not less than sixteen inches in length, and shall bear the land surveyor's registration number affixed, except however, the monument for a corner which falls upon solid rock or concrete shall be metal, magnetically detectable, firmly embedded, and stamped with the land surveyor's registration number.

9. The land surveyor shall prepare a scaled drawing of the results of survey for presentation to the client unless adequate existing information is available. In cases where a certification is required by state or local ordinance, the land surveyor must certify only those matters personally known to be absolutely true and must declare all other items only to the limit of the land surveyor's knowledge and belief.

10. The land surveyor must prepare and cause to be recorded corner records and record of survey documents if a material discrepancy exists in angular and/ or lineal calls as compared with new survey values as defined under Measurements Specifications Table 2 of these standards of practice.

Legal Descriptions

When a land surveyor is called upon to prepare a legal description of real property, the land surveyor must include the following:

1. Sufficient caption, body, and where applicable, qualifying clauses.

2. Clearly stated relationship between the real property being described and the survey control or basis of unique location.

3. Clearly stated basis of bearing bearings or language which otherwise makes definite the method of direction and orientation for the lines of the subject property being described and the survey control related thereto when applicable.

4. Full and complete citations to maps, plats, documents, and other matters of record, fact or pertinence, which are intended to be incorporated into and made part of the legal description by reference thereto.

5. When called out, complete and detailed descriptions of physical monuments, both natural and artificial, such as to facilitate future recovery and to enable positive identification.

6. When appropriate, incorporated either by direct or by citation, sufficient data to enable a check of mathematical closure for the subject property being described.

7. The land surveyor's validated Arizona seal.

Measurement Specifications

Measurements for the performance of land surveys as defined in A. R. S. 32-101(B)(19)(a)(b) & (c) Land Surveying Practice shall comply with the following required.

1. In order to properly apply the specifications herein to achieve the required accuracy the land surveyor must first classify the survey relative to the "Class of Survey" listed in Table 1. The

land surveyor shall then apply at least the minimum specifications as listed in the appropriate column in Table 2. An error of measurement which is less than 0.03 feet between sequential monuments shall not by itself constitute a material discrepancy in any class of survey.

2. The significance of a discrepancy between the angular and lineal calls of record versus that resulting from the use of these specifications may only be determined from an analysis predicated on the law of random error propagation. If a material discrepancy is found to exist, appropriate action as outlined in these standards of practice shall be applied by the land surveyor.

Table No. 1

Class A. Urban Surveys:

Surveys of land lying within or adjoining a city or town. This would also include the surveys of commercial and industrial properties, condominiums, townhouses, apartments and other multi-unit developments, regardless of geographic location.

Class B. Suburban Surveys:

Surveys of land lying outside of urban areas. This land is used almost exclusively for single family residential use or residential subdivisions.

Class C. Rural Surveys:

Surveys of land such as farms and other undeveloped land outside the suburban areas which may have a potential for future development.

Class D. Mountain and Marshland Surveys:

Surveys of land which normally lies in remote areas with difficult terrain and which usually has limited potential for development.

Tables 1 and 2 Extracted from the current *Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys* as adopted by American Land Title Association and American Congress on Surveying & Mapping".

Classifications of ALTA-ACSM Land Title Surveys

Introduction

The degree of precision and accuracy necessary for a particular cadastral survey should be based on the intended use of the land without regard to its present use, provided the surveyor has knowledge of the intended use. If the surveyor has no such knowledge, the degree of precision may be based on the present use of the land.

Four general survey classes are defined using various state regulations and accepted practices. These general classes are listed and defined below.

Survey Classes by Land Use

Urban Surveys:

Surveys of land lying within or adjoining a city or town. This would also include the surveys of commercial and industrial properties, condominiums, townhouses, apartments and other multi-unit developments, regardless of geographic location.

Suburban Surveys:

Surveys of land lying outside of urban areas. This land is used almost exclusively for single family residential use or residential subdivisions.

Rural Surveys:

Surveys of land such as farms and other undeveloped land outside the suburban areas which may have a potential for future development.

Mountain and Marshland Surveys:

Surveys of land which normally lies in remote areas with difficult terrain and which usually has limited potential for development.

Should these above cited specifications be in conflict with state laws, rules or regulations, the more stringent requirements must be followed.

The combined precision of a survey can be statistically assured by dictating a combination of survey closure and specified procedures for a particular survey class. ACSM and ALTA have adopted specific procedures for control surveys in order to assure the combined precision of a particular survey class. The statistical base for these specifications is on file at ACSM and is available for inspection. The surveyor shall employ, in his or her judgment, proper field procedures, instrumentation and adequate survey personnel in order to achieve accuracy's comparable to those adopted by ACSM for a designated class of survey.

American Congress on Surveying and Mapping
Minimum Angle, Distance and Closure Requirements for Classes of Surveys

SURVEY CLASS (1)	DIR. READING OF INSTRUMENT (2)	INSTRUMENT READING ESTIMATED (3)	NUMBER OF OBSER-VATION PER STATION (4)	SPREAD FROM MEAN OF D&R NOT TO EXCEED (5)	ANGLE CLOSURE WHEN N=NO. OF STATIONS NOT TO EXCEED	LINEAR CLOSURE (6)	DISTANCE MEASURE-MENT (7)	MINIMUM LENGTH OF MEASURE-MENT (8).(9),(10)
URBAN	20”<1> 10” E	5”<0.1’>N.A.	2D&R	5”<0.1’ >5” E	10”x square root N	1:15,000	EDM or Doubletape with steel tape	(8) 81m, (9) 153m (10) 20m
SUBURBAN	20”<1’> 10” E	10”<0.1’ N.A.	2 D&R	10”<0.2’>10” E	15” x square root N	1:10,000	EDM or steel tape	(8) 54m, (9) 102m (10)14m
RURAL	20”M<1’>20”E	N.A.	1D&R	20”M<0.3’>20” E	20” x square root N	1:7,500	EDM or steel tape	(8) 40m, (9) 76m (10)10m
MOUNTAIN/ MARSHLAND	1’ M<1’>1’ E	N.A.	1D&R	30”M<0.5’>30” E	30” x square root N	1:5,000	EDM or steel tape	(8) 27m, (9)51m (10)7m

Note (1) All requirements of each class must be satisfied in order to qualify for that particular class of survey. The use of a more precise instrument does not change the other requirements, such as number of angles turned, etc.

Note (2) Instrument must have a direct reading of at least the amount specified (not an estimated reading), i.e.: 10”=Micrometer reading theodolite, <1’> = scale reading theodolite, E=electronic reading theodolite, M=micrometer reading theodolite, or a vernier reading transit.

Note (3) Instrument must have the capability of allowing an estimated reading below the direct reading to the specified reading.

Note (4) D&R means direct and reverse positions of the instrument telescope, i.e., Urban Surveys require that two angles in the direct and two angles in the reverse position be measured and meaned.

Note (5) Any angle measured that exceeds the specified amount from the mean must be rejected and the set of angles re-measured.

Note (6) Ratio of closure after angles are balanced and closure calculated.

Note (7) All distance measurements must be made with a properly calibrated EDM or Steel tape, applying atmospheric, temperature, sag, tension, slope, scale factor and sea level corrections as necessary.

Note (8) EDM having an error of 5mm, independent of distance measured (Manufacturer’s specifications)

Note (9) EDM having an error of 10mm, independent of distance measured (Manufacturer’s specifications)

Note (10) Calibrated steel tape.